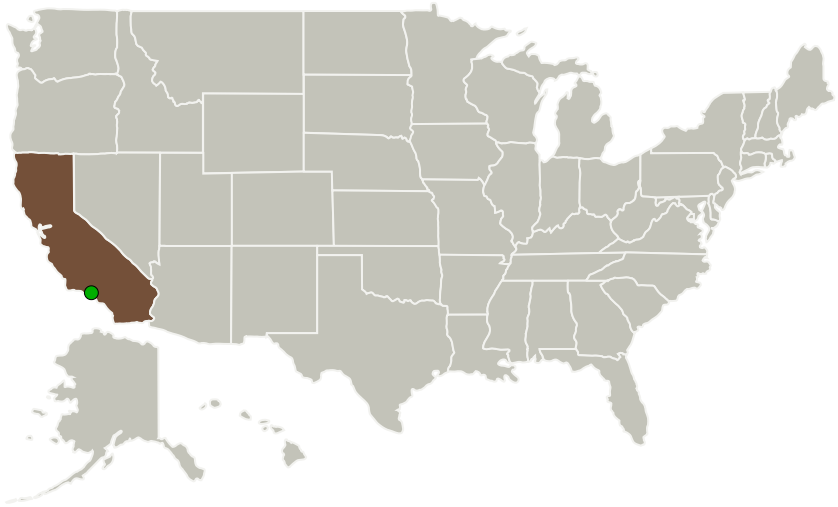
Low-Stress Silicon Cladding for Surface Finishing Large UVOIR Mirrors, Phase II

Completed Technology Project (2014 - 2016)

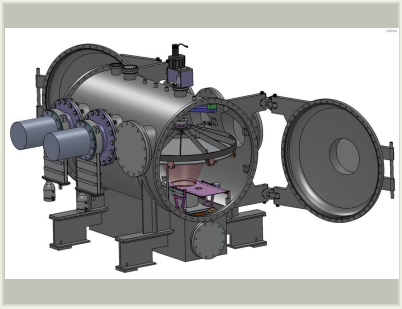
Project Introduction

In this Phase I research, ZeCoat Corporation demonstrated a low-stress silicon cladding process for surface finishing large UVOIR mirrors. A polishable cladding is desired for SiC optics so they may be figured in less time, and so they may be polished to levels suitable for UVOIR astronomy. ZeCoat has filed a provisional US patent application for the technology. The proposed process is directly scalable to SiC mirrors several meters in diameter. The process is based on a novel, low temperature, ion-assisted, evaporation technique (IAD), whereby the coating stress of a silicon film may be manipulated from compressive to tensile, in order to produce a near-zero net stress for the complete layer. A Si cladding with little intrinsic stress is essential to allow thick coatings to be manufactured without cracking. A low stress coating also minimizes substrate bending that would otherwise distort the figure of very lightweight mirrors.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
ZeCoat Corporation	Lead Organization	Industry	Torrance, California
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California



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Primary U.S. Work Locations
California

Project Transitions

April 2014: Project Start

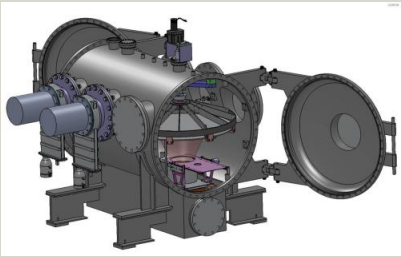
April 2016: Closed out

Closeout Summary: Low-Stress Silicon Cladding for Surface Finishing Large UV OIR Mirrors, Phase II Project Image

Closeout Documentation:

- Final Summary Chart Image*(https://techport.nasa.gov/file/137642)*

Images



Briefing Chart Image
Low-Stress Silicon Cladding for Surface Finishing Large UVOIR Mirrors, Phase II
(https://techport.nasa.gov/image/135614)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
ZeCoat Corporation

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

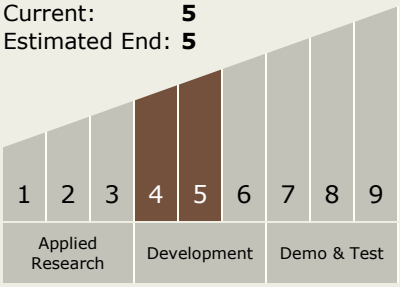
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
David Sheikh

Technology Maturity (TRL)

Start: **4**
Current: **5**
Estimated End: **5**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.2 Observatories
    - TX08.2.1 Mirror Systems

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System